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ABSTRACT

One hundred undergraduate students at a large southern university were the subjects of a study to determine whether the persuasion process encompasses two mutually exclusive strategies--systematic or heuristic processing of information--or whether the two processes are, in fact, independent. Subjects participated in groups of about 15 and were randomly assigned to the two treatment groups. In an effort to demonstrate that the heuristic and systematic processes could be used simultaneously, three constructs--need for cognition, argument quality, and non-content heuristic--were operationalized. The study was a laboratory experiment employing a repeated measures design, and the design of the experiment yielded three types of data: those generated from evaluating the overall message, the individual arguments, and the cumulative arguments. Results indicated that (1) heuristic and systematic processes can be used simultaneously while encountering a persuasive communication; (2) being motivated to use heuristic processes appears to be different from being unmotivated to use systematic processes; and; (3) a study of interactions between motivations for using heuristic processes and motivations for using systematic processes is in order. (Three figures of data are included.) (NH)

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Evaluating Persuasive Messages: Systematic and Heuristic Strategies

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ABSTRACT

During the past decade researchers have modeled the persuasion process as one that encompasses two information processing strategies undertaken by message receivers. Coined the central route or systematic processing, one strategy entails using thoughtful considerations of a message's content to decide whether to yield to the message's advocated behavior. The other strategy, peripheral route or heuristic processing, depends on non-content cues to determine whether one should yield. The two strategies have been described as analogous to cognition and affect and have been assumed to be dependent as polar opposite anchors of a continuum or as mutually exclusive constructs. This paper provides a rationale for assuming the processes are independent and provides evidence supporting that contention.

The Heuristic Model of Persuasion as espoused by Chaiken (1987) suggests people, when they are motivated to do so, "exert little cognitive effort in judging the validity of a persuasive message and, instead, may base their agreement with a message on a rather superficial assessment of a variety of extrinsic persuasion cues such as surface or structural characteristics." Indeed, the model gains support from a number of research findings such as those finding message characteristics, (eg., number of arguments), source characteristics (eg., credibility, perceived power, and likability), and receiver predispositions (eg., emotional state) all have an effect on the effectiveness of a persuasive message regardless of the message's actual content (Tan, 1985).

The model gains tangential support from Petty and Cacioppo's Elaboration Likelihood Model (1986).[1] The ELM has seven postulates, the second of which states:

> Although people want to hold correct attitudes, the amount and nature of issue-relevant elaborations in which they are willing or able to engage to evaluate a message vary with individual and situational factors.

This postulate suggests people will think about an object as a function of their motivation and of their ability to do so.

The ELM also suggests people's mental dealings with objects occur in one of two ways -- centrally or peripherally.

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[1] Chaiken points out that the heuristic model is not synonymous with Cacioppo and Petty's peripheral route. The peripheral route, she states, includes the heuristic model as well as a number of other phenomena.

Central route processing requires the refining of information in a manner that persuasive message arguments are considered, weighed, and judged "using thoughtful consideration of the information at hand." The peripheral route is analogous to affect and includes Chaiken's heuristic model. It uses little cognitive effort in making decisions. For example, the peripheral route depends on factors such as rewards associated with an advocated position, sender characteristics, and non-content message characteristics.

The ELM also postulates that:

> As motivation and/or ability to process arguments is decreased, peripheral cues become relatively more important determinants of persuasion. Conversely, as argument scrutiny is increased, peripheral cues become relatively less important determinants of persuasion.

This sixth postulate of the ELM suggests that the analogs of cognition and affect are bi-polar opposites, that they are dependent. Some researchers, however, have suggested cognition and affect are independent. Izard (1984) looked at childhood development as a means of understanding the independence of cognition and emotion. She cited interest, a positive emotion, as an example of an affective state that can motivate cognitive activity. More recently, Swann, Griffin, Predmore, and Gains (1987), found evidence suggesting cognition and affect are independent.

Further, Tversky and Kahneman (1974) found that heuristic-based decisions were made by people who, in terms of the ELM, were both motivated and able to centrally process their at-hand information.

Tversky and Kahneman (1971) reported people's holding a belief in "the law of small numbers" and "the gamblers fallacy." The former "law" incorrectly states characteristics of samples drawn from a population will resemble the characteristics of the population (even with small samples) far better than sampling theory predicts. Adherents of the law of small numbers are both trained statisticians and lay persons. In other words, Tversky and Kahneman found "representativeness" to be the heuristic of choice when dealing with probability judgments.

That lay persons would be found to use heuristics to make probability judgments is neither surprising nor counter to the assumptions of the ELM, for lay persons are neither necessarily able nor necessarily motivated to use established laws of probability in their decision-making processes. Trained statisticians, however, can be described to be both able and motivated to engage in a thoughtful consideration of the information at hand -- use laws of probability -- when making probability judgments. Considering again the ELM's sixth postulate, the statisticians' behavior poses a problem. Although the postulate is expressed in a within subjects fashion, Tversky and Kahneman's between subjects findings illustrate that people (the statisticians) who are both motivated and able, as well as people (lay persons) who are neither necessarily motivated nor necessarily able, relied upon (in the language of Petty and Cacioppo) the peripheral route to make their probability judgments.[2] In other words, people

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[2] At this point the following question should be answered: Is there reason to assume the mental processes studied by Tversky and Kahneman are anything like the processes examined by Cacioppo and Petty or Chaiken? When considered in terms of Miller's (1956) work with the "magical number

who should have been found to be on opposite ends of the continuum were found to be on the same end.

In a like manner, Chaiken (1980) assumed people use either systematic or heuristic strategies when dealing with message input:

> A functional perspective suggests that recipients will employ a systematic strategy when reliability concerns, and a heuristic strategy when economic concerns predominate.
> Reliability concerns should be paramount and a systematic strategy therefore employed when recipients perceive that it is important to formulate a highly accurate or veridical opinion judgment. . . . When asked for an opinion on an unimportant topic or when one's opinion judgment is perceived as inconsequential, recipients may give economic concerns greater weight and employ a heuristic processing strategy.

Again, the implicit assumption is that systematic processes and heuristic processes are dependent. Either you are interested in

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seven plus or minus two" it appears there is reason to make that assumption. Miller concluded that human beings can deal with approximately seven chunks of information at one time. It requires two bits of information storage space to hold the decision that an object is either good or bad, warm or hot, green or not green, of whatever the decision to be made is. When an object like a persuasive message containing n individual arguments is being evaluated, therefore, two to the n^{th} power bytes of memory storage space are required to make the combinations of judgments needed to make an overall qualitative evaluation of the message.

Making that series of either/or decisions can be described as being analogous to assigning zeros and ones to the individual judgments. If, as Miller has argued, human qualitative judgments are analogous to a computer's binary system of using zeros and ones to create and store information, then the making of qualitative judgments like those considered by Cacioppo and Petty is quite similar to the making of probability judgments, for, as conceptualized by Miller, overall evaluation of a persuasive message requires compiling a running total of frequencies of the analogs to zeros and ones. Probability judgments require keeping track of percentages. Percentages, in turn, are nothing more than converted raw frequencies.

reliability and, therefore, choose systematic processing, or you are interested in economy and, therefore, choose heuristic processing; but you do not choose both.

Despite the models' implicit assumption of dependence, research findings hint that the opposite may be the case.

As noted, Izard and Swann et al. argued that cognition and affect are independent.

Further, a consideration of findings by Cacioppo, Petty, and Morris (1983); Petty and Cacioppo (1979); Petty, Cacioppo, and Goldman (1981); and Axsom, Yates, and Chaiken (1987) point in the direction of independence. Cacioppo et al. found that people high in Need For Cognition held opinions about a persuasive message that were mediated by the quality (strong or weak) of the message's individual arguments. Petty and Cacioppo and Petty et al. found that issue involvement, used as a motivation for engaging in thoughtful consideration of message arguments, discriminated among subjects in much the same manner as did NFC. They found that people highly involved with the subject of a persuasive message held opinions about the message that were mediated by the quality (strong or weak) of the message's individual arguments. The opinions of those people uninvolved in the message's topic were mediated by argument quality to a significantly lesser degree. That NFC, which is a construct that conceivably could be argued to include the ability as well as the motivation to engage in systematic (central route) processes, was found to discriminate among people just as did issue involvement, which is a construct that cannot conceivably be argued to include that

same ability, suggests that NFC does not include ability and leads to the following proposition:

> *Proposition* 1: Need for Cognition is a measure of motivation for engaging in systematic (central route) processes, not of ability to engage in those processes.

Cacioppo et al. focused their attention on subjects with an intrinsic motivation for using systematic (central route) processes -- high NFC. They manipulated argument strength, an extrinsic systematic (central route) cue. Subjects high in NFC responded to that manipulation; those low in that quality did not. Axsom et al., however, did the opposite; they focused their attention on subjects lacking the intrinsic motivation for using systematic (central route) processes. They manipulated audience response, a heuristic (peripheral route) cue as well as message involvement. Subjects low in NFC, those lacking the intrinsic motivation for systematic (central route) processing, who were exposed to an uninvolving message responded to the manipulation. Subjects low in NFC who were exposed to an involving message, on the other hand, did not respond to the manipulation. And, all subjects high in NFC were unresponsive to the manipulation. In essence, Axsom et al. created a 2 x 2 x 2 (audience response x NFC x involvement) between subjects design.[3] They found a three-way interaction among audience response, NFC, and involvement. In short, the manipulation of involvement appears to have been an overriding factor for subjects low in NFC. That is, being

3 They also manipulated argument strength. There was an argument strength main effect associated with this manipulation.

involved with the message appears to have caused subject low in NFC to fail to use heuristic (peripheral route) cues in evaluating the message. That failure leads to a second proposition:

> *Proposition* 2: Although people low in need for cognition tend to engage in the alternative to systematic (central route) processes, being low in need for cognition is not the same as being motivated to engage in heuristic (peripheral route) processes.

Returning to the work of Tversky and Kahneman, a third proposition emerges. As noted, they found that people who would be expected to be on opposite ends of the cognition/affect, central route/peripheral route, systematic/heuristic continuum were on the same end. That contradiction leads to:

> *Proposition* 3: Systematic (central route) and heuristic (peripheral route) processes are independent.

The third proposition, in turn, led to the development of this study's research question: Are the systematic (central route) and heuristic (peripheral route) processes anchors of a continuum, or are they independent processes that can be engaged in simultaneously.

It was reasoned that the processes' independence can be established by creating an experimental setting in which subjects high in NFC would be able to use the two processes simultaneously when dealing with one object. The one object, a persuasive message, would have to possess an intrinsic systematic (central route) cue as well as an intrinsic heuristic (peripheral route) cue. If the two cues, then, were

to lead to the two processes' simultaneous use, it could then be argued that the two processes are independent.

The above reasoning led to five hypotheses.

The first two deal with intrinsic systematic (central route) and heuristic (peripheral route) cues and were posed as manipulation checks in the study's laboratory experiment:

> *Hypothesis* 1: Strong persuasive arguments will be evaluated more highly than will weak persuasive arguments.
>
> *Hypothesis* 2: A version of a persuasive message possessing a positively-valued intrinsic non-content characteristic will be evaluated more highly than will a version of the message identical in content but possessing a negatively-valued intrinsic non-content characteristic.

The third and fourth hypotheses result from the discussions of previous research findings that led to propositions 1 and 2:

> *Hypothesis* 3: People will have similar abilities to engage in thoughtful considerations of persuasive message arguments regardless of their level of need for cognition.
>
> *Hypothesis* 4: Level of need for cognition is negatively related to the dependence on heuristic processes and positively related to dependence on systematic processes for evaluating persuasive messages so that:
>
> A: Persons low in need for cognition will and person high in need for cognition will not evaluate persuasive messages possessing a positively-valued non-content characteristic to

be more sound than persuasive messages identical in content but possessing a negatively-valued non-content characteristic.

B: Persons high in need for cognition will and persons low in need for cognition will not evaluate strong persuasive message arguments to be more sound than weak persuasive message arguments regardless of the arguments' possession of either positively- or negatively-valued non-content characteristics.

The study's fifth hypothesis is a result of the third proposition.

This hypothesis required placing people high in need for cognition into a situation where they could engage in both systematic (central route) and heuristic (peripheral route) processes. Assuming systematic (central route) and heuristic (peripheral route) cues can be created and incorporated into one persuasive message, the problem of predicting when and how people high in need for cognition would behave in displaying their dependence on both processes remained.

Miller (1956) provided a solution. In a description that is analogous to bytes of computer memory, Miller suggested that human beings can deal with a "magical number seven plus or minus two" chunks of information at any one time. He found the phenomenon to be applicable to people of all kinds. He used the term "channel capacity" to describe the amount of information a person is able to deal with in a communication situation.

Miller explained that, although the human mind can deal with approximately seven chunks of information at one time, dealing with those seven chunks represents only about 2.5 bits of judgmental information. He defined a bit of information as the amount of

information required to make a choice between alternatives. Thus, two chunks of information are used up when we decide between two alternatives. Coupling that first judgment with a second judgment uses up four chunks. And making a third judgment that is predicated upon the first two uses up eight chunks. Thus, although the magical number is seven, it represents the ability to deal with only two to three dependent judgments at a time. Miller's two- to three-bit channel capacity is conceptualized as a number of bits of cognitive information that must be analyzed simultaneously, individually, and within the confines of one communication.

> *Hypothesis* 5: A two- to three-bit channel capacity exists and represents the point at which heuristic (peripheral route) processes will be undertaken so that, regardless of level of need for cognition, all people will evaluate persuasive messages possessing a positively-valued non-content characteristic more highly than persuasive messages possessing a negatively-valued non-content characteristic.

METHOD

Construct Operationalizations

Three constructs, NFC, argument quality, and non-content heuristic, were operationalized.

Need for Cognition: Scores elicited using Cacioppo and Petty's (1984) Need for Cognition Scale were used as the operationalization of NFC. Extending Cohen's (1957) work, Cacioppo and Petty (1982,

1984) developed their scale which measures differences in people's proclivities for engaging in and enjoying thinking.[4]

Argument quality: Sophomore communications students at a large southern university were asked to list on a piece of paper qualities they use as a guide to decide if an argument is "strong." The 20 students generated a list of qualities, many of which dealt with source characteristics. Those dealing with source characteristics were discarded. Of the remaining, however, five qualities -- believable, sound, reasonable, logical, and convincing -- emerged as message characteristics the students named more than once as those by which they would judge a persuasive argument. The five were used in the subsequent analyses as a five-item index. Immediately after they listed the characteristics of sound argumentation, the same students were exposed to a scenario in which one might seek to institute a task force for race relations at a state supported university. The students were then asked to list five "strong" and five "weak" reasons for establishing such a task force.[5] The effort yielded 31 unique reasons. These data were compiled into a questionnaire and presented to a separate group of 22 sophomore communications students at the same university. These students were asked to evaluate the 31 reasons for having a task force using the five-item index described above.

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4 Cacioppo and Petty conducted four experiments achieving statistical significance and designed to the test the validity of their scale. Included in their analyses was the computation of Chronbach's Alpha, the lowest of which was .90 for the 18-item version of the scale.

5 A task force for race relations was chosen as the topic of the message because a task force somewhat like the one described in the message had been in existence at the site of the study approximately six months earlier, making the topic one with which the subjects were familiar.

The five-item index was analyzed using principal components analysis.[6] Mean scores were compiled for the 31 reasons. Index scores for the reasons were the operationalization of argument quality.

Non-content heuristic: This operationalization included using Flesch's (1948) formula for human interest and the difference between active and passive voice. Manipulating human interest, according to the Flesch formula, is a function of including personal pronouns into a passage. A passage low in human interest is one devoid of personal pronouns, and one high in that quality is one including personal pronouns. The label used to describe the non-content heuristic is "readability." The readable version of the persuasive message used in the study was one including as many personal pronouns as possible and written in active voice. The unreadable version lacked personal pronouns and was written in passive voice. To test the content of the two message versions, three masters students majoring in communications at the same university were asked to judge the versions for meaning. All three made suggestions, and after implementation of the suggestions, all three judged the versions to be identical in meaning.

Instrument Creation

Creating the instrument required operationalizing a persuasive message and a point in that message that was analogous to Miller's two- to three-bit channel capacity:

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6 With a minimum eigenvalue criterion of 1.00, a principal components factor analysis generated one factor. After constraining the program to generate two factors and specifying a verimax rotation, the analysis showed all items loading of the first factor and all but one (believable) with a higher loading on the first factor than on the second.

Persuasive message: One persuasive message was operationalized. Consisting of 10 arguments (five pretested as the strongest and five pretested as the weakest among the 31 unique reasons discussed earlier), the message was constructed to fall in the following sequence:

Iteration One	--	Strong argument
Iteration Two	--	Weak argument
Iteration Three	--	Weak argument
Iteration Four	--	Strong argument
Iteration Five	--	Strong argument
Iteration Six	--	Weak argument
Iteration Seven	--	Weak argument
Iteration Eight	--	Strong argument
Iteration Nine	--	Strong argument
Iteration Ten	--	Weak argument

The use of a message thus created should have yielded an evaluation of "strong" by subjects exposed to only the information in the first iteration, an evaluation of "weak" by subjects exposed to the information contained in the first three iterations, and an evaluation of "neutral" by subjects exposed to the information contained in the first seven iterations if the subjects were using their judgments of the actual content of the individual arguments to make their evaluations. In other words, if people base these cumulative evaluations of the message on a composite of their evaluations of the individual arguments, the cumulative evaluations should follow a pattern of going from strong to weak back toward strong until neutral is reached; the neutral evaluations should be consistent from about the seventh iteration through the tenth.

Channel capacity: Miller's two- to three-bit channel capacity was operationalized by partialing out evaluations of each individual

argument. Using a print medium, subjects read the persuasive message one argument at a time. The message was presented in the form of booklets; the booklets contained one argument per page. As each argument was read, subjects were asked to judge the overall message based on the content they had read to that point. The procedure continued for 10 iterations. The judgments of the individual arguments were, thus, designed to correspond to Miller's bits of information. Making an evaluation (strong or weak) of the first argument required two bytes of mental capacity; combining the second evaluation with the first squared the space required; and combining the first two with the third cubed the required space to eight bytes. Thus, as subjects approached the third page, they should have begun to reach their channel capacities, or in Miller's terms the magical number seven should have been reached.

Experimental Design

The study was a laboratory experiment employing a repeated measures design. One hundred undergraduate students at a large southern university were the subjects.

Readable and unreadable versions of the persuasive message arguing for the reinstitution of a task force for race relations at a hypothetical college were developed. Subjects participated in groups of about 15; they were randomly assigned to the two treatment groups. Instructions for participation were read aloud to the subjects. The study was described as a pretest of a grant proposal. Subjects were told they were being asked to evaluate the portion of the proposal designed to justify the task force's being reinstituted. Further, they

were told they were being asked to evaluate the proposal in three ways: as an entire message, individually by argument, and cumulatively as the individual arguments combined to create the whole message. Subjects were told the three evaluation processes were necessary to determine the proposal's strengths and weaknesses as an entire message, by individual arguments, and as the individual arguments built into the entire message. After message evaluations were finished, subjects completed the Need for Cognition Scale. Upon completing the scale, subjects were debriefed, thanked, and dismissed.

Thus, subjects used the five-items described earlier in a nine-point Likert scale to evaluate the persuasive message in three ways:

First: They read and evaluated the entire message as a whole. This was their initial exposure to the message; this exposure and evaluation occurred during the same session as all other exposures and evaluations.

Second: They evaluated each of the 10 individual arguments constituting the entire message.

Third: They evaluated the arguments in a cumulative manner that was done simultaneously with the individual evaluations. This process required reading the first individual argument and evaluating it. The process next required the subjects to read the second individual argument, consider their evaluation of it, and to combine that evaluation with their evaluation of the first argument. Next, the process required evaluating the third individual argument, combining that evaluation with the cumulative evaluation of the first two individual arguments. The process continued through the remaining iterations until a cumulative evaluation predicated on the 10 individual

arguments was created. The individual arguments appeared on separate pages. The directions for the second individual and first cumulative evaluations were as follows:

> "Directions: As you did with the first individual argument, read the following argument and indicate the degree to which you either agree or disagree with the statements following it."
>
> *individual argument*
>
> *index items*
>
> "Directions: Now, without looking back an any previous pages, remember as well as you can the first individual argument. Combine your feelings about the first argument with your feelings about the second argument and respond to the following statements."
>
> *index items*

Identical directions appeared on subsequent pages of the experimental booklets.

RESULTS

The design of the experiment yielded three types of data: those generated from evaluating the overall message, the individual arguments, and the cumulative arguments.

Manipulation Checks

Because of the complexity of the experimental design and the experiment's unnatural setting, a number of manipulation checks were conducted. The first two were results of hypotheses 1 and 2. Both hypotheses were supported. Because Hypothesis 1 dealt with

argument strength and because argument strength is a message quality that is independent of the context in which it appears, the analysis of data for Hypothesis 1 used as its dependent variable scores generated from the individual evaluations. Additionally, the repeated measures design created 1,000 observations of the individual evaluations, yielding highly significant ANOVA findings ($F=373.58$, $df=1$, $p<.0001$). The marginal scores (with higher scores indicating argument/message strength) for each condition were: strong = 6.74; weak = 3.90.

Because Hypothesis 2 was designed to test the difference styles of writing, a contextual characteristic, make in message evaluation, cumulative evaluations, which were designed to capture contextual characteristics, were used as the dependent variable. Again, N = 1,000, and again, statistical significance was found ($F=3.86$, $df=1$, $p<.05$). The marginal scores (with higher scores indicating argument/message strength) for each condition were: readable = 4.77; unreadable = 4.51.

Because of the experiment's unnatural setting, it certainly can be argued that any differences in receiver reaction to the readability version manipulation and/or argument quality manipulation was the result of the setting and not of any differences in how people differ in their dealings with persuasive messages. To help defuse that objection, a comparison was made between the overall evaluations of the persuasive message and the tenth cumulative evaluations. Gathered at the beginning of the experiment and from the message as it would naturally appear -- in its entirety -- the overall evaluations resulted from natural encounters with the message. Conversely, the tenth cumulative evaluations were gathered as the last part of subjects'

encounters with the message versions and after any contamination from the unnatural setting would have been introduced. Thus, non-significant ANOVA findings would, while not entirely precluding the possibility, lend a degree of confidence that it was not the setting that caused any differences in behavior. Indeed, comparing the overall with the tenth cumulative evaluations yielded non-significance.

Finally, it can be argued that dealing with the unreadable version of the message was a more difficult intellectual exercise than dealing with the readable version. Consequently, NFC scores could have been influenced by treatment group assignment. Here, again, however, an ANOVA of group assignment on NFC score yielded non-significance.

Tests of Propositions

Ability: Hypothesis 3 states that people, regardless of their level of need for cognition, will display similar abilities to engage in thoughtful consideration of persuasive message arguments. An analysis of variance of NFC and iteration on individual evaluation found no NFC by iteration interaction. While, as one would expect from the results of testing Hypothesis 1, there was an iteration main effect ($F=30.89$, $df=9$, $p<.01$), there was neither an NFC main effect nor an NFC by iteration interaction detected. Figure 1 depicts the almost identical levels of ability to deal with and evaluate the individual arguments displayed by subjects high and low in NFC. The data support Hypothesis 3.

(Figure 1 Goes About Here)

Choice of Process. Support was found for Hypothesis 4A but not for Hypothesis 4B. That is, subjects low in NFC were found to display a greater response to the readability manipulation than did subjects high in NFC. Subjects high in NFC, however, were not found to display a greater response to the argument strength manipulation than did subjects low in NFC. Multivariate analysis of variance was conducted to test hypotheses 4A and 4B. In MANOVA terms, Hypothesis 4A states an interaction exists between NFC score and readability group assignment. That relationship was found ($F=3.99$, $df=1$, $p<.05$). Hypothesis 4B states an interaction exists between NFC score and argument strength. That relationship was not found. In order to interpret the MANOVA testing Hypothesis 4A, an analogous ANOVA was conducted, and, using ANCOVA procedures, cell mean estimates were generated depicting the NFC score by readability group assignment interaction. Figure 2 shows that Hypothesis 4A was, indeed, supported.

(Figure 2 Goes About Here)

Independence. Qualified support was found for Hypothesis 5. This hypothesis predicted that subjects high in NFC would respond to the argument strength manipulation when making cumulative evaluations until their channel capacities were exceeded. At that point, those subjects, like their counterparts low in NFC, would be responsive to the readability style manipulation. Testing that required a MANOVA seeking a three-way (NFC by cumulative evaluation by readability style) interaction. It was not found. A two-way (NFC by

cumulative evaluation) interaction, however, was found ($F=6.33$, $df=9$, $p<.0001$). An analogous ANOVA was conducted with which cell mean estimates were generated that allowed the graphic depiction in Figure 3 of the two-way interaction.

As can be seen in Figure 3, the arrangement of persuasive message arguments appears to have induced subjects high in need for cognition to react to a negative information bias upon reaching their channel capacities. This negative information bias (or rotten apple effect) appears to be the heuristic subjects high in NFC chose when reaching their channel capacities, for, as predicted, it was between the second and third iterations that these subjects tended to deviate from the predicted pattern of cumulative evaluations.

(Figure 3 Goes About Here)

In any event, the practical significance in the result is found when considering the difference in the ways subjects high and low in NFC created their cumulative evaluations during the fourth through tenth iterations.

As Figure 3 shows, evaluations made by subjects high in NFC did not recover from the effects of the proposed rotten apple affect. Their cumulative evaluations from the fourth through the tenth iterations were 11 percent lower than those made by subjects low in NFC. Additionally, as tests of Hypothesis 3 revealed, the rotten apple effect did not affect subjects' high in NFC perceptions of the individual arguments. Their individual evaluations were virtually identical to those made by subjects low in NFC. And both groups' individual

evaluations followed the pattern predicted by the pretesting and arrangement of the individual arguments. In other words, beginning with the same perception of the individual arguments, subjects high and low in NFC created different perceptions of the entire message -- the sum of the parts added to different wholes for the two groups.

Mathematically, it was the subjects low in NFC who were more accurate in creating their wholes. A test of subjects' high and low in NFC ability to maintain a running average of their individual evaluations when creating their cumulative evaluations shows no significance difference between the average of the individual evaluations and their tenth cumulative evaluations for subject low in NFC. For those high in NFC, however, there was a significant difference ($t=3.73$, $df=47.7$, $p<.0001$). with 10th cumulative evaluations scoring lower than the average of the individual evaluations.

As noted, there was no difference in the two groups' ability to evaluate the individual arguments, and concluding that subjects high in NFC are unable to maintain an accurate mathematical accounting of the arguments in creating their cumulative evaluations is untenable, especially when one considers that subjects low in NFC were able to. It follows, then, that the subjects high in NFC, who held an intrinsic motivation to engage in systematic processing, were also motivated to use some heuristic to make their cumulative evaluations. It appears that the heuristic was the rotten apple effect.

Although all of the predictions of the Hypothesis 5 were not accurate as stated, subjects high in NFC appear to have adopted a heuristic in making their cumulative evaluations. They adopted the

heuristic between the second and third iterations. The final hypothesis, therefore, received qualified support.

DISCUSSION

The intent of the study was to create an experimental environment in which people holding an intrinsic motivation to engage in thoughtful considerations of a body of information available to them would also be motivated to respond to a heuristic cue intrinsic to the medium carrying the body of information. The hope was that it would be demonstrated that heuristic and systematic processes could, indeed, be simultaneously used while encountering a persuasive communication. The simultaneous use of the two processes, in turn, would lend support to the contention that the processes are independent rather than dependent as Petty and Cacioppo and Chaiken et al. propose.

That appears to have been accomplished.

An implication of the findings is concluding that being motivated to use heuristic processes is different from being unmotivated to use systematic processes. In the terms of the ELM, holding a low NFC is not the same as being motivated to use peripheral cues. Chaiken et al. measured their subjects' NFC (an intrinsic motivation to use what they called systematic processes) and manipulated message involvement (an extrinsic motivation to use systematic processes). They found that only those subjects low in NFC and uninvolved with the message used heuristic processes. The results of this study and the findings of Chaiken et al. appear to indicate that studies measuring NFC and manipulating message involvement have been examining interactions

between two motivations for using systematic processes. In other words, it appears that there may be motivations for using heuristic processes -- a need for affect, perhaps -- and that a study of interactions between motivations for using heuristic processes and motivations for using systematic processes is in order.

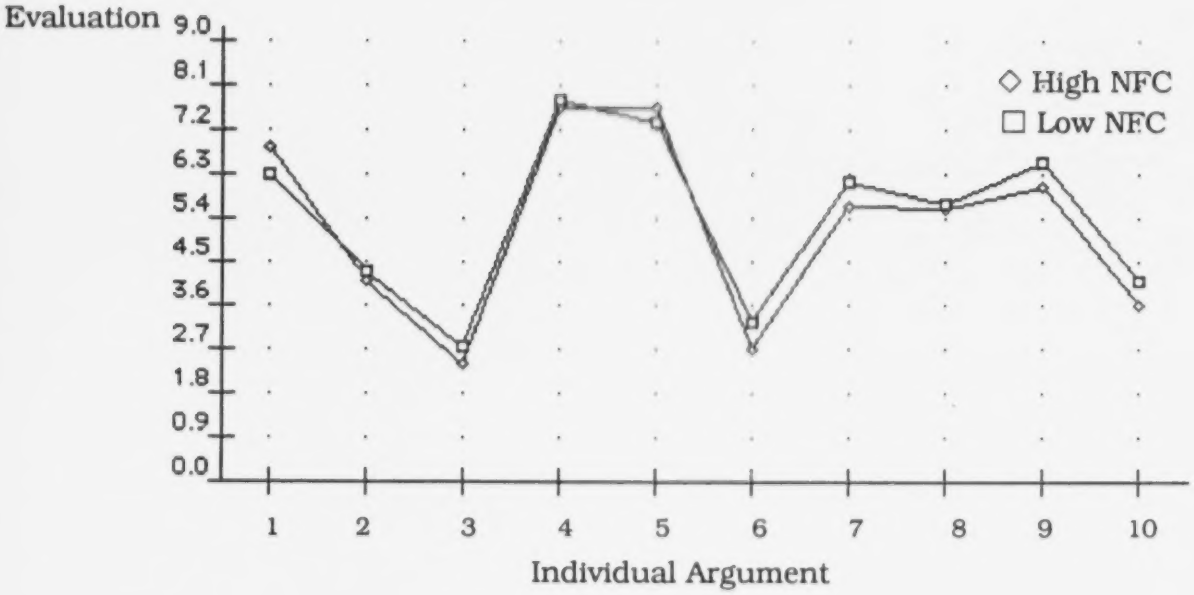

Figure 1: Message Evaluation by Need For Cognition by Individual Argument

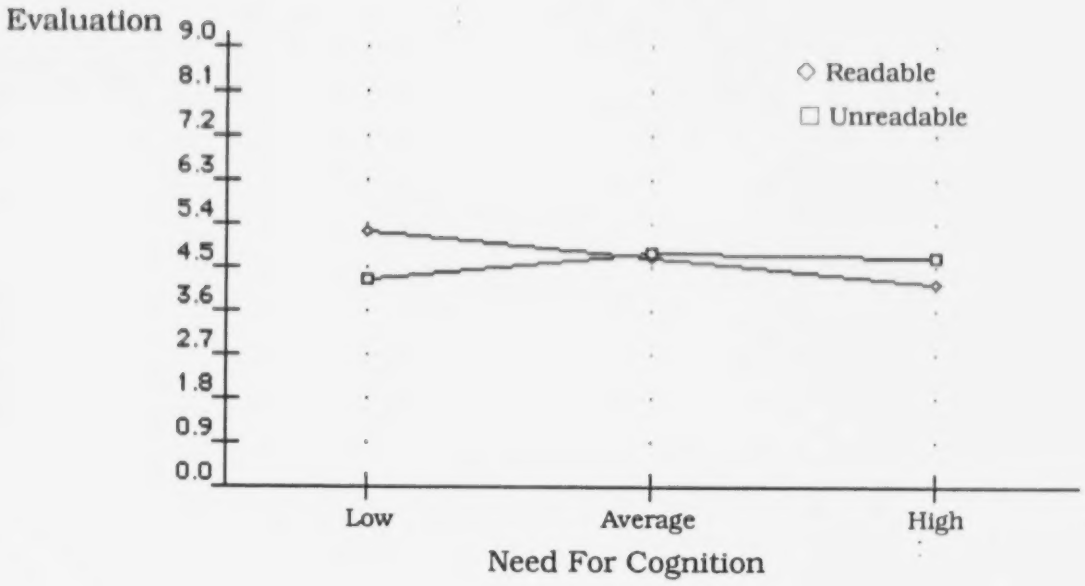

Figure 2: Message Evaluation by Readability Style by Need For Cognition

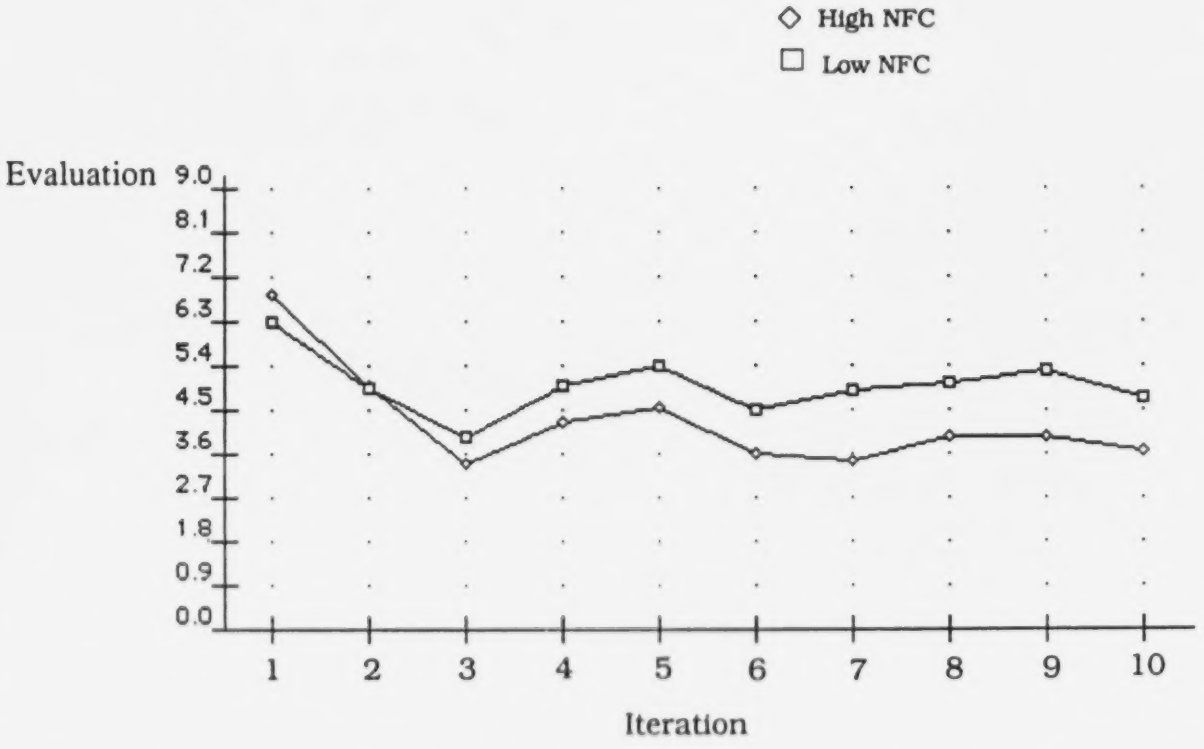

Figure 3: Message Evaluations by Need For Cognition by Iteration

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